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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/669,186

09/24/2003

Victor M. Benveniste

02-IMP-037

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10/26/2006

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EXAMINER

VANORE, DAVID A

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 10/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/669,186	<b>Applicant(s)</b> BENVENISTE, VICTOR M.	
	<b>Examiner</b> David A. Vanore	<b>Art Unit</b> 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 21-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 21-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed September 28, 2006 have been fully considered but they are not persuasive.
2. Applicant has argued at pages 6-7 that the rationale for obviousness applied to claim 1, for example, is improper. The examiner disagrees with Applicants' remarks. The claim requires first and second permanent magnets to create a substantially uniform magnetic field across a beam path. In the prior art relied upon, the magnets 110 and 112 create substantially uniform magnetic field B0 on a beam path. The difference between the prior art and the instant application being that the prior art magnets are electromagnets.
3. Electromagnets and permanent magnets both produce magnetic field, the difference between the two types of magnets being that in permanent magnets, the field is created by substantially co-alignment of the domains of ferromagnetic particles in the magnet material, whereas in an electromagnet, the field is created by an electric current. However, both produce a magnet field. Therefore, no new and unexpected result can be inferred from utilizing a permanent magnet in place of an electromagnet, as the main advantage of a permanent magnet is that it requires no electrical consumption. The main advantage of an electromagnet is the potential to vary field strength and that the field may be terminated when current flow is stopped. Benveniste requires that two magnetic components 110 and 112 be used to produce a substantially uniform field B0, therefore the prior art relied upon does not appear to teach away from the instant

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invention as both the claim and prior art require two magnetic field generating components to produce a substantially uniform magnetic field in the path of a ribbon ion beam.

4. Applicant cites that such use of electromagnets negates the "zoom lens" effect discussed in Benveniste. However, such effect is caused when current is reversed in coils 132-133 and 136-137, which are separate coils from the primary coils 122 and 123 which work in conjunction with pole pieces 110 and 112 to generate primary field B0. Applicant's arguments relying upon the "zoom lens" effect are therefore not persuasive.
5. Applicant has based remarks concerning the remaining claims on the argument tendered in regards to claim 1. Since the argument for the allowability of claim 1 over the prior art and the reasons supplied in the previous Office action are not persuasive, all claims stand finally rejected.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4-7, 9-13, 15-17, 21, 23, and 25-29 stand rejected and claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable in view of Benveniste. (USPN 5,554,857).

3. Regarding claims 1, 21, 26, and 29, Benveniste teaches a ribbon ion beam implantation system comprising an ion source (Item 18), an extraction system (24) for extracting desired ions from a source, and a mass analyzer comprising magnets (110 and 112) to select an ion species. The magnets of Benveniste comprise ferromagnetic pole pieces and coils, i.e. electromagnets.

4. Benveniste fails to teach or suggest the use of a permanent magnet in place of an electromagnet.

5. Modifying the Benveniste apparatus to utilize a permanent magnet as opposed to an electromagnet alter the source of the magnetic field, but not the critical function of the field in the controlled deflection of ions passing through said field.

6. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a permanent magnet instead of an electromagnet because a permanent magnet produces a constant magnetic field without causing undesired pole piece heating as in an electromagnet. The use of a permanent magnet or electromagnet is not critical in the practice of the Benveniste invention. The critical aspect of the magnet used is the field that is produced. An electromagnet enables a variable or controllable magnetic field of varying strength to be created. Further, an electromagnet may be turned off. The rationale applied to claims 1, 21, 26, and 29 is similarly applied to claims 4-13, 15-17, 23, 25, and 27-28.

7. Regarding claims 4-5, Benveniste teaches that the ion implanter is a low energy implanter, which performs below ten thousand eV. Note Col. 2.

8. Regarding claim 6, Fig. 17 illustrates a range of positional deviation of the ion beam path within the magnet, which ranges about 50 mm in a magnet. Therefore, the magnetic field has a length of about 5 cm through which the ion beam travels.
9. Regarding claims 7 and 25, Benveniste teaches a magnetic field oriented along a short dimension of an ion beam (Note Fig. 16).
10. Regarding claim 8, the magnetic field is an electromagnetic field which decays inversely proportional to the square of the distance from the source of said field. Such decay is a rapid decay.
11. Regarding claims 9-13, Benveniste teaches the use of boron, phosphorous, or arsenic as a source and the selected implantation of positive boron or phosphorous species into a sample (Col. 3-4).
12. Regarding claims 15 and 23, Benveniste teaches an ion implantation system having an end station having a wafer (16).
13. Regarding claim 16, Benveniste further teaches that the ion implantation system comprises a control circuitry (100).
14. Regarding claims 16 and 17, the extraction means (24) extracts desired ions and accelerates them into the mass analyzer. Since the extraction means is an electronic device, they inherently require a control circuitry associated therewith to input the required signal to the electrodes for generating the required electric field for ion extraction.
15. Regarding claim 27, the mass analyzer is downstream of the extraction system (Fig. 1).

16. Regarding claim 28, the mass analyzer deflects undesired species from the beam path (Col. 4 Lines 38-45).

17. Claims 2 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste (5,554,857) in view of Vahrenkamp (4,315,153).

18. Regarding claims 2 and 22, Benveniste teaches all the required limitations of claim 1, including a beam acceleration means (24).

19. Benveniste fails to teach that the beam acceleration means is positioned downstream a mass analysis element.

20. Vahrenkamp teaches an ion beam irradiation device having a beam acceleration means (42) located downstream from a mass separator.

21. Vahrenkamp modifies the device of Benveniste to situate a beam acceleration means downstream a mass separation means.

22. It would have been obvious to one having ordinary skill in the art at the time the invention was made to locate a beam accelerating means down stream from a mass separator to provide control of the energy of the ion species selected to be implanted into a sample.

23. Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste (USPN 5,554,857) in view of Horsky et al. (US Patent Application Publication No. 2004/0104682).

24. Benveniste teaches all the limitations of claim 1.

25. Benveniste teaches an extraction means (24) comprising a plurality of electrodes, but fails to explicitly disclose a triode extraction means.
  26. Horsky et al. teaches the use of a triode extraction arrangement (Fig. 7a-7c).
  27. Horsky et al. modifies the device of Benveniste to utilize a triode electrode arrangement to extract ions from an ion source.
  28. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a triode to extract ions from an ion source because Horsky et al. teaches such an arrangement confers the advantage of improved ion beam focusing (Paragraph 159).
  29. Claims 14 and 24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste (USPN 5,554,857).
  30. Benveniste teaches all the required limitations of claims 1 and 23 as pointed out above.
  31. Benveniste fails to teach that an ion beam has width of about or greater than 300 mm.
  32. The ion beam of Benveniste inherently has a width for implanting ions into a wafer. Modifying the beam width of Benveniste is an alteration of the size of the beam of Benveniste. One would expect that by changing the width of the beam would enable varying amounts of the wafer to be illuminated.
- It would have been obvious to one having ordinary skill at the time the invention was made to vary the size of the beam as it impinges on the substrate to control the amount



of the surface illuminated by the beam, and the amount of the surface of the wafer implanted at a give time to enable control of the ion dose imparted to the wafer.

Resizing the beam of Benveniste is a change in size of an element taught by the prior art, which does not produce an unexpected result, and is therefore an obvious modification of the prior art. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

### ***Conclusion***


6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Vanore whose telephone number is (571) 272-2483. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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Primary Examiner  
Art Unit 2881

dav